

**Building 2 Amendment and
Monitoring Well Installation
Report**

Boeing Realty Corporation,
Former C-6 Facility,
Los Angeles, California

PREPARED FOR

Boeing Realty Corporation



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Boeing Realty Corporation,
Former C-6 Facility,
Los Angeles, California

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Boeing Realty Corporation

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1. Introduction

Boeing Realty Corporation (BRC) has investigated groundwater at the Former C-6 facility (site) located in Los Angeles, California. The site location map is illustrated on Figure 1. Investigations have shown the presence of volatile organic compounds (VOCs) in groundwater at certain areas of the site. To facilitate groundwater remediation, *In-Situ* Reactive Zone (IRZ) technology was selected to optimize and enhance biodegradation of VOCs.

This report details the installation of the IRZ system that consists of amendment points and monitoring wells. The system was installed to include the former Building 2 Area and the southern end of the former Building 1/36 Area. The IRZ system at the northern end of the former Building 1/36 Area will be installed at a later time. Figure 2 illustrates the location of the amendment points and monitoring wells. Figures 3 through 7 provide the details of the amendment point and monitoring well locations. Workplans were submitted to and approved of by the Los Angeles Regional Water Quality Control Board prior to commencement of the well installation program. These workplans included: *Building 2 In-Situ Reactive Zone Pilot Test Workplan* dated August 15, 2002; *Addendum to the Building 2 in-situ reactive zone Pilot Test Workplan* dated July 31, 2002; and *Building 1/36 Area (Parcel C) Source-Area Groundwater In-Situ Reactive Zone Pilot Study Workplan* dated May 10, 2002.

1.1 Purpose

The purpose of the amendment wells is to provide a mechanism to deliver carbohydrate solution to target groundwater impacted by VOCs. Food grade carbohydrate solution will be added to each amendment point to create a reactive zone at and downgradient of each amendment point. The purpose of the groundwater monitoring wells is to monitor the progress of the IRZ. More specifically, the groundwater monitoring wells will be used for baseline, process, and performance monitoring.

1.2 Site Characteristic

The site is underlain by the Bellflower Aquitard, which is a regional hydrogeologic feature in the Los Angeles basin. Vadose zone soils at the site consist predominantly of silts, clays, and fine-grained sands, which are highly heterogeneous across the site and are impacted in certain areas with VOCs. The primary VOCs found in soil include trichloroethylene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA).

Groundwater at the site occurs at a depth of approximately 63 to 69 feet below ground surface (bgs), approximately -11 to -17 feet below Mean Sea Level (MSL).

Groundwater is present under unconfined conditions and flows generally to the south. The water-bearing zone beneath the site consists of two primary units, the Middle Bellflower Sand, which is the water-bearing unit, and the Lower Bellflower Aquitard, which separates the Middle Bellflower Sand from the underlying Gage Aquifer. The Middle Bellflower sand extends to a depth of approximately 115 feet bgs (approximately -63 feet below MSL) and consists of three sub-units; the B-Sand, the Middle Bellflower Mud (BFM), and the C-Sand. The B-Sand is present from approximately 65 to 90 feet bgs (approximately -13 to -38 feet below MSL) and consists predominantly of a fine to medium sand. The BFM is a silt and clay layer that is present from approximately 90 to 95 feet bgs (approximately -38 to -43 feet below MSL) and appears to be present across much of the site. The C-Sand is present from approximately 100 to 125 feet bgs (approximately -48 to -73 feet below MSL) and consists predominantly of a fine to medium sand. Groundwater at the site is relatively flat, at a gradient of 0.001, and flows predominantly to the south at a rate of approximately 10 to 30 feet per year. Groundwater at the site is impacted with VOCs, primarily TCE and 1,1-dichloroethylene (1,1-DCE).

2. Well Installation

A total of 169 amendment points and 15 groundwater monitoring wells were installed within the former Building 2 Area and the southern end of the former Building 1/36 Area. The majority of the IRZ system (167 amendment points and 13 groundwater monitoring wells) was installed between May and September 2003. One dual-nested amendment point (IRZB0037A/B) and one dual-nested monitoring well (IRZMW001A/B) were installed in June 2002. These wells were installed for hydraulic testing purposes and will be used in the IRZ system. Figures 2 through 7 illustrate the locations of the amendment points and groundwater monitoring wells.

The sections below describe pre-field installation activities, amendment point and monitoring well installation procedures, pressure testing of the amendment points, and monitoring well development. All field activities were performed under an approved Health and Safety Plan prepared for the pilot test (ARCADIS, 2002c). Health and Safety Plan field forms are provided in Appendix A.

2.1 Pre-Field Activities

2.1.1 Well Installation Permits

Well construction permits for the amendment points and monitoring wells were obtained from the County of Los Angeles Department of Health Services. Copies of the well permits are included in Appendix B.

2.1.2 Utility Clearance

Underground Service Alert (USA) was notified prior to drilling. Proposed well locations were hand augered to a depth of 5 feet bgs and at a width equal to the width of the drilling auger. Some proposed amendment point and monitoring well locations were moved 3 to 5 feet to avoid underground utilities.

2.2 Amendment Point Construction Methodology

2.2.1 Amendment Point Installation (B-Sand)

A total of 149 amendment points were installed in the B-Sand (includes the former Building 2 Area and the southern end of Building 1/36 Area). The B-Sand amendment points are identified by the prefix “IRZB”. Locations of the IRZ amendment points are summarized below and illustrated on Figures 2 through 5.

§ To add carbohydrate solution in the highest VOC concentration area within the former Building 2 Area, thirty-eight (38) amendment points were located (approximately 30 foot center-to-center distance between points) inside the 10,000 micrograms per liter ($\mu\text{g}/\text{L}$) TCE contour line (Appendix C). Two amendment point configurations were used to accommodate variability in the stratigraphy and the TCE distribution across this target area. A shallow point was screened to target the upper saturated sandy-silt layer (screened from approximately 65 and 75 feet bgs or -13 and -23 feet MSL), and a deeper point was screened to target the B-sand zone (screened from approximately 75 to 90 feet bgs or -23 and -38 feet MSL). These amendment points are: IRZB0023A/B, IRZB0026A/B, IRZB0027A/B, IRZB0030A/B, IRZB0031A/B, IRZB0033A/B, IRZB0034A/B, IRZB0037A/B, IRZB0038A/B, IRZB0042A/B, IRZB0043A/B, IRZB0045A/B, IRZB0046A/B, IRZB0047A/B, IRZB0049A/B, IRZB0050A/B, IRZB0051A/B, IRZB0054A/B, and IRZB0055A/B.

- § Eighty (80) amendment points were located between the 5,000 and 10,000 µg/L TCE contour line within the former Building 2 Area (Appendix C). The points were spaced in rows using approximately 30-foot centers perpendicular to the groundwater flow direction. The amendment point configuration was a single point screened to address the saturated unit (screened from approximately 65 to 90 feet bgs or -13 and -38 feet MSL). These amendment points are IRZB0001 through IRZB0022, IRZB0024, IRZB0025, IRZB0028, IRZB0029, IRZB0032, IRZB0035, IRZB0036, IRZB0039, IRZB0040, IRZB0041, IRZB0044, IRZB0048, IRZB0052, IRZB0053, and IRZB0056 through IRZB0099.
- § Thirty-one (31) amendment points were located inside the 5,000 µg/L TCE contour line at the southern end of Building 1/36 Area (Appendix C). The amendment points were spaced in rows using approximately 30-foot centers perpendicular to the groundwater flow direction. The amendment point configuration was a single point screened to address the saturated unit (screened from approximately 65 to 85 feet bgs or -12 and -32 feet MSL). These amendment points are AW0135 through AW0165.

The majority of the amendment points (137 points) were installed using a cone penetrometer testing (CPT) rig to advance a hollow rod with a steel tip to the desired depth. A ¾-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and screen (with 0.01-inch slots) was inserted into the steel rod to the desired depth. The steel rod was carefully removed to leave the PVC casing and screen in place. Depending on the amendment point location, either 10, 15, 20 or 25 feet of screened was used. Clean sand, bentonite chips, and volclay grout were used to complete the construction of the amendment points. These amendment points were installed by Gregg Drilling and Kehoe Testing. Construction details for each amendment point are summarized in Table 1 and Appendix D.

Hollow stem auger (HSA) rigs were used to install the remainder of the amendment points. The HSA rigs were used to install amendment points when refusal was encountered with the CPT rigs, or when CPT rig access to the amendment point was not available. A total of 32 amendment points were installed using a HSA rig. Construction was similar to that described in the paragraph above. The amendment point was either completed with a ¾- or 1.5-inch diameter Schedule 40 PVC. These amendment points were installed by West Hazmat and WDC Exploration. Construction details for each amendment point are summarized in Table 1 and Appendix D.

At the completion of each amendment point, the amendment well heads were connected to High Density Polyethylene (HDPE) hoses and routed to access vaults. The HDPE hoses were placed in trenches and backfilled. Carbohydrate solution will be delivered to the amendment points by accessing Vaults 1, 2, 3, and 5 (Figure 2).

2.2.2 Amendment Point Installation (C-Sand)

Twenty (20) amendment points were installed within the C-Sand to deliver carbohydrate solution to groundwater impacted by VOCs. The C-sand source area is defined as the area where TCE concentrations are detected above 5,000 µg/L contour line (Appendix C). The amendment points were spaced approximately 30 feet on center to establish a treatment line that is perpendicular to the direction of groundwater flow. The C-Sand amendment points are identified by the prefix "IRZC". These amendment points are IRZC0001 through IRZC0020. Figure 2 and 6 illustrate the locations of the C-Sand amendment points.

The C-Sand amendment points were installed using a HSA rig. A 1.5-inch diameter Schedule 40 PVC casing with 25 feet of 0.01-inch slotted screen (placed at depths from approximately -42 to -65 feet MSL) was installed inside the 8-inch diameter borehole. Clean sand was placed in the borehole to approximately 1 foot above the well screen. Approximately 10 feet of bentonite chips was placed above the sand to create a seal around the PVC casing. Volclay grout was used to backfill the annular space to ground surface. These amendment points were installed by WDC. Construction details for each amendment point are summarized in Table 1 and Appendix D.

At the completion of each amendment point, the amendment point well heads were connected to HDPE hoses and routed to Vault 4 (Figure 2). The HDPE hoses were placed in trenches and backfilled. Carbohydrate solution will be delivered to the amendment points by accessing Vault 4.

2.3 Amendment Point Well Head Injection Test

The well heads of the amendment points were tested prior to being connected to the HDPE hose. The purpose of the well head tests were to determine if the amendment were constructed properly, if the well seal was in good condition, and if the well could be used for injection. Of the 169 amendment points installed, 164 points were tested. Five amendment points were not tested either due to the construction schedule or to a determination that a test was not necessary because of successful well head tests.

nearby. The five amendment points that were not tested are IRZB0037A, IRZB0037B, IRZB0098, IRZB0099, and IRZC0020.

The well tests were conducted by adding between 20 and 100 gallons of potable water to the amendment points. The water was obtained from a hydrant supplied by the Los Angeles Department of Water and Power. The pressure at each well ranged between less than 2 pounds per square inch (psi) to 20 psi. The connection to each well head consisted of a turbine flow totalizer with a digital display, a source valve, a pressure gauge, and quick connect fittings. These components are mounted to a plate for stability and accurate gauge readings.

An amendment point was determined to have failed the well head test if water or grout was observed to rise to ground surface during the test. Such an event indicated that the well seal could not hold the pressure and that the amendment point could not be used for injection purposes. A summary of the test results with respect to the B-Sand and C-Sand are discussed below. Details on the injection pressure, flow rate, volume of water injected are summarized in Table 2 and Appendix E.

§ B-Sand: A total of 145 amendment points installed in the B-Sand were tested. Of this total, 134 amendment points passed the well head test and 11 amendment points failed (7.6%). The amendment points that failed were IRZB0016, IRZB0023A, IRZB0026A, IRZB0034A, IRZB0045A, AW0136, AW0151, AW0162, AW0163, AW0164, and AW0165. These amendment points were abandoned and reinstalled within 3-5 feet of the original location. Following reinstallation activities, the new amendment points were tested. All the reinstalled amendment points passed the well head test, with the exception of amendment points AW0136 and IRZB0023A which could not be retested due to construction schedule constraints.

§ C-Sand: A total of 19 amendment points within the C-Sand were pressure tested. All 19 amendment points (IRZC0001 to IRZC0019) passed the well head test.

2.4 Groundwater Monitoring Well Construction Methodology

A total of twelve (12) monitoring wells were installed to monitor the progress of groundwater remediation. Within the former Building 2 Area, five monitoring wells were installed in the B-Sand (IRZMW001A/B, IRZMW002A/B, IRZMW003A/B, IRZMW004, and IRZMW005); and six monitoring wells were installed in the C-Sand (IRZCMW001, IRZCMW002, IRZCMW003, CMW001, CMW002, and CMW0026).

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One B-Sand monitoring well (MW005) was installed at the southern end of the former Building 1/36 Area.

The monitoring wells were installed using a HSA drill rig. Well screens were completed with either 1.5, 2, or 4-inch diameter 0.01-inch slotted Schedule 40 PVC. The monitoring wells were completed at ground surface with a 12-inch diameter well box. Construction details are for each monitoring well summarized in Table 3 and Appendix D. The locations of the monitoring wells are described in the sections below and are illustrated in Figure 2.

During well installation, soil samples were collected from two boreholes (IRZMW003A/B and ITRZCMW002) for profiling purpose. Soil samples were collected at 5-foot intervals. Boring logs for these locations are included in Appendix D.

2.4.1 Monitoring Well Network (B-Sand)

A total of six monitoring wells were installed in the B-Sand. The locations and rationale for each well are summarized below:

- § IRZMW001A/B: The purpose of this well is to monitor the groundwater downgradient of amendment point IRZB0037A/B. The monitoring well will be used for mid-term monitoring (expected to see results approximately 6 months after initial injection). Monitoring well IRZMW001A/B is a dual-nested well that will be used to monitor groundwater in the Upper and Lower B-Sand. The monitoring well is located approximately 10 feet directly downgradient of IRZB0037A/B.
- § IRZMW002A/B: The purpose of this well is to monitor the groundwater downgradient of amendment point IRZB0037A/B. The well will be used for short-term monitoring (expected to see results approximately 2 weeks after initial injection). Monitoring well IRZMW002A/B is a dual-nested well that will be used to monitor groundwater in the Upper and Lower B-Sand. The monitoring well is located approximately 6 feet downgradient and 3 feet crossgradient of IRZB0037A/B.
- § IRZMW003A/B: The purpose of this well is to monitor the groundwater downgradient of amendment point IRZB0037A/B. The well will be used for long-term monitoring (expected to see results approximately greater than 1 year after

initial injection). Monitoring well IRZZMW003A/B is a dual-nested well that will be used to monitor groundwater in the Upper and Lower B-Sand. The monitoring well is located approximately 30 feet downgradient and 15 feet cross gradient of IRZB0037A/B.

- § IRZMW004: The purpose of this well is to monitor the groundwater down gradient of amendment point IRZB0095. The well will be used for mid-term monitoring (expected to see results approximately 6 months after initial injection). The monitoring well is located approximately 15 feet downgradient and 7.5 feet crossgradient of IRZB0095.
- § IRZMW005: The purpose of this well is to monitor the groundwater down gradient of amendment point IRZB0081. The well will be used for short-term monitoring (expected to see results approximately 2 weeks after initial injection). The monitoring well is located approximately 6 feet directly down gradient of IRZB0081.
- § MW0005: This monitoring well is located at the southern end of the former Building 1/36 Area. The well will be used to monitor groundwater in the Upper B-Sand and to assess if the reactive zone has traveled outside the treatment area. The monitoring well is located 90 feet downgradient from the furthest down gradient treatment row in the former Building 1/36 Area.

2.4.2 Monitoring Well Network (C-Sand)

A total of six monitoring wells were installed in the C-Sand. The locations and rationale for each monitoring well are summarized below:

- § IRZCMW001: The purpose of this well is to monitor groundwater from a background location (upgradient of the treatment area). The monitoring well is located approximately 30 feet upgradient of the first treatment row.
- § CMW026: The purpose of this well is to monitor the groundwater down gradient of amendment point IRZC0004. The well will be used for short-term monitoring (expected to see results approximately 2 weeks after initial injection). The monitoring well is located approximately 6 feet down gradient and 3 feet cross gradient of IRZC0004.
- § IRZCMW003: The purpose of this well is to monitor the groundwater downgradient of amendment point IRZC0004. The well will be used for mid- to

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long-term monitoring (expected to see results approximately 6 months to 1 year after initial injection). The monitoring well is located approximately 22 feet down gradient and 15 feet cross gradient of IRZC0004.

- § IRZCMW002, CMW001, and CMW002: The purpose of these wells is to monitor groundwater in the C-Sand and to assess if the reactive zone has traveled outside the treatment area. IRZCMW002 is located approximately 90 feet down gradient of the farthest down gradient treatment row. Monitoring wells CMW001 and CMW002 are respectively located approximately 450 and 560 feet down gradient from the farthest down gradient treatment row.

2.4.3 Well Development Activities

The monitoring wells were developed by surging, bailing, and/or pumping on September 8, 9, and 10, 2003. The objectives of well development were to remove sediment that may have accumulated during well installation, to consolidate the filter pack around the well screen, and to enhance the hydraulic connection between the target zone and the monitoring well. In each case, a bailer was used to remove sediment and turbid water from the well bottom. A surge block was then used within each screened interval to flush the filter pack and screen. The monitoring wells were bailed again to remove sediment drawn into the well by the surging process until suspended sediment was minimized. Following the bailing and surging steps, the monitoring wells were further developed using pumping methods. During development, field parameters (turbidity, pH, specific conductance, dissolved oxygen, and temperature) of the purge water were measured and recorded. Well development sheets are included in Appendix F. Monitoring wells IRZMW001A/B, IRZMW002A/B, and IRZMW003A/B were redeveloped in October 2003 due to additional silt and fines encountered in the monitoring wells.

3. Waste Disposal

Waste soil and water generated during amendment point and monitoring well installation activities was containerized and sampled for waste profiling purposes. The analytical results were forwarded to BRC which independently profiled, manifested, and disposed of the waste soil and water.

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4. Summary

ARCADIS installed an IRZ system with 169 amendment points in the vicinity of the former Building 2 Area and the southern end of the former Building 1/36 Area. In addition, a total of 15 monitoring wells (of which 3 are dual-nested wells) were installed and developed to monitor remedial progress. The IRZ system consists of the following:

- A total of 149 amendment points installed within the B-Sand of the Middle Bellflower Sand. Within the former Building 2 Area, the B-Sand amendment points are identified by the prefix “IRZB”, and within the former Building 1/36 Area, the B-Sand amendment points are identified by the prefix “AW”;
- A total of 20 amendment points installed within the C-Sand of the Middle Bellflower Sand. Within the former Building 2 Area, the C-Sand amendment points are identified by the prefix “IRZC”;
- A total of 6 monitoring wells installed within the B-Sand of the Middle Bellflower Sand. Monitoring wells IRZMW0001A/B, IRZMW0002A/B, and IRZMW0003A/B are dual-nested wells. These monitoring wells and monitoring wells IRZMW004, IRZMW005 and MW0005 will be used to monitor groundwater in the Upper and Lower B-Sand. The monitoring wells were developed in preparation for baseline groundwater sampling;
- A total of 6 monitoring wells installed within the C-Sand of the Middle Bellflower Sand. These monitoring wells are identified as IRZCMW001, IRZCMW002, IRZCMW003, CMW001, CMW002, and CMW026. The monitoring wells were developed in preparation for baseline groundwater sampling.

A well head injection test was performed at 164 of the amendment points. All but 11 of the amendment points passed the injection test. The amendment points that failed were abandoned, reinstalled, and then retested. Of the 169 amendment points, 7 amendment points could not be tested due to construction or schedule constraints.

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5. References

ARCADIS Geraghty & Miller, Inc. 2001. *Building 2 In-situ Reactive Zone Pilot Test Workplan*, Boeing Realty Corporation, Former C-6 Facility, Los Angeles, California, August 15.

ARCADIS Geraghty & Miller, Inc. 2002a. *Building 1/36 Area (Parcel C) Source-Area Groundwater In-Situ Reactive Zone Pilot Study Workplan*, Boeing Realty Corporation, Former C-6 Facility, Los Angeles, California, May 10.

ARCADIS Geraghty & Miller, Inc. 2002b. *Addendum to the Building 2 In-situ Reactive Zone Pilot Test Workplan*, Boeing Realty Corporation, Former C-6 Facility, Los Angeles, California, July 31.

ARCADIS Geraghty & Miller, Inc. 2002c. *Health and Safety Plan, In-Situ Reductive Zone Pilot Test*, Boeing Realty Corporation, Former C-6 Facility, Los Angeles, California, June 24.

Tables

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**Table 1. Amendment Point Construction
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Well	Completion Date	Surface Elevation (MSL, ft)	Total Depth (ft)	Casing Diameter (inches)	Screened Interval (ft bgs)	Slot Size (inches)	Sand Pack (ft bgs)	Bentonite Seal (ft bgs)	Volclay Grout (ft bgs)	Drilling Contractor
IRZB0001	5/20/2003	54.1	83	0.75	68 - 83	.01	.67 - .83	.61 - .67	.0 - .61	Kehoe Testing
IRZB0002	5/19/2003	54.1	88	0.75	68 - 88	.01	.66.5 - .88	.60 - .66.5	.0 - .60	Gregg Drilling
IRZB0003	5/20/2003	54.1	83	0.75	68 - 83	.01	.67 - .83	.61 - .67	.0 - .61	Gregg Drilling
IRZB0004	5/20/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	Gregg Drilling
IRZB0005	5/20/2003	54.1	83	0.75	68 - 83	.01	.67 - .83	.61 - .67	.0 - .61	Kehoe Testing
IRZB0006	5/23/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.65 - .67	.0 - .65	WDC
IRZB0007	5/22/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	WDC
IRZB0008	5/20/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	Kehoe Testing
IRZB0009	5/20/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	Kehoe Testing
IRZB0010	5/20/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	Gregg Drilling
IRZB0011	5/21/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	Gregg Drilling
IRZB0012	5/21/2003	54.1	93.2	0.75	68.2 - 93.2	.01	.67 - 93.2	.61.4 - .67	.0 - .61.4	WDC
IRZB0013	5/22/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	WDC
IRZB0014	5/21/2003	54.1	93.5	0.75	68.5 - 93.5	.01	.67.5 - 93.5	.61.3 - .67.5	.0 - .61.3	WDC
IRZB0015	5/21/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.62.5 - .67	.0 - .62.5	Kehoe Testing
IRZB0016	5/21/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.62.5 - .67	.0 - .62.5	Gregg Drilling
IRZB0017	5/23/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.65 - .67	.0 - .65	WDC
IRZB0018	5/27/2003	54.1	93	1.5	68 - 93	.01	.67 - .93	.65.5 - .67	.0 - .65.5	West Hazmat
IRZB0019	5/23/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.65.5 - .67	.0 - .65.5	WDC
IRZB0020	5/19/2003	54.1	83	0.75	68 - 83	.01	.66.5 - .83	.60 - .66.5	.0 - .60	Gregg Drilling
IRZB0021	5/27/2003	54.1	93	1.5	68 - 93	.01	.67 - .93	.65.5 - .67	.0 - .65.5	West Hazmat
IRZB0022	5/23/2003	54.1	93	0.75	68 - 93	.01	.66.5 - .93	.64 - .66.5	.0 - .64	WDC
IRZB0023A	5/23/2003	54.1	78	0.75	68 - 78	.01	.66.5 - .78	.61 - .66.5	.0 - .61	Kehoe Testing
IRZB0023B	5/23/2003	54.1	93	0.75	78 - 93	.01	.77 - .93	.72 - .77	.0 - .72	Gregg Drilling
IRZB0024	5/27/2003	54.1	93.2	1.5	68.2 - 93.2	.01	.67.1 - 93.2	.60.9 - .67.1	.0 - .60.9	West Hazmat
IRZB0025	5/22/2003	54.1	93	0.75	68 - 93	.01	.67 - .93	.61 - .67	.0 - .61	WDC
IRZB0026A	5/27/2003	54.2	78	0.75	68 - 78	.01	.66.5 - .78	.60 - .66.5	.0 - .60	Kehoe Testing
IRZB0026B	5/27/2003	54.2	93.2	0.75	78 - 93.2	.01	.76.5 - .93.2	.72 - .76.5	.0 - .72	Kehoe Testing

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**Table 1. Amendment Point Construction
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Well	Completion Date	Surface Elevation (MSL, ft)	Total Depth (ft)	Casing Diameter (inches)	Screened Interval (ft bgs)	Slot Size (inches)	Sand Pack (ft bgs)	Bentonite Seal (ft bgs)	Volclay Grout (ft bgs)	Drilling Contractor
IRZB0027A	5/28/2003	54.25	78.2	0.75	68.2 - 78.2	0.01	66.7 - 78.2	60 - 66.7	0 - 60	Kehoe Testing
IRZB0027B	5/28/2003	54.25	93.5	0.75	78.5 - 93.5	0.01	76.5 - 93.5	70 - 76.5	0 - 70	Kehoe Testing
IRZB0028	5/27/2003	54.2	93.4	1.5	68.4 - 93.4	0.01	67 - 93.4	61 - 67	0 - 61	West Hazmat
IRZB0029	5/21/2003	54.2	93	0.75	68 - 93	0.01	67 - 93	61.5 - 67	0 - 61.5	WDC
IRZB0030A	5/23/2003	54.2	78	0.75	68 - 78	0.01	67 - 78	65.5 - 67	0 - 65.5	Gregg Drilling
IRZB0030B	5/23/2003	54.2	93	0.75	78 - 93	0.01	77 - 93	73 - 77	0 - 73	Gregg Drilling
IRZB0031A	5/21/2003	54.2	78	0.75	68 - 78	0.01	65.5 - 78	61 - 65.5	0 - 61	Gregg Drilling
IRZB0031B	5/21/2003	54.2	93	0.75	78 - 93	0.01	76.5 - 93	72 - 76.5	0 - 72	Gregg Drilling
IRZB0032	5/27/2003	54.2	93	1.5	68 - 93	0.01	67 - 93	65 - 67	0 - 65	West Hazmat
IRZB0033A	5/23/2003	54.16	78	0.75	68 - 78	0.01	67 - 78	65.5 - 67	0 - 65.5	Gregg Drilling
IRZB0033B	5/23/2003	54.16	93	0.75	78 - 93	0.01	77 - 93	75.5 - 77	0 - 75.5	Gregg Drilling
IRZB0034A	5/27/2003	54.2	78.5	0.75	68.5 - 78.5	0.01	67 - 78.5	60 - 67	0 - 60	Gregg Drilling
IRZB0034B	5/27/2003	54.2	93.2	0.75	78.2 - 93.2	0.01	76.7 - 93.2	70 - 76.7	0 - 70	Gregg Drilling
IRZB0035	5/28/2003	54.2	93.2	1.5	68.2 - 93.2	0.01	67 - 93.2	60.8 - 67	0 - 60.8	West Hazmat
IRZB0036	5/21/2003	54.2	93	0.75	68 - 93	0.01	67 - 93	61 - 67	0 - 61	WDC
IRZB0037A	6/25/2002	53.77	75	1.5	65 - 75	0.01	63 - 75	59 - 63	0 - 59	Gregg Drilling
IRZB0037B	6/25/2002	53.77	90	1.5	80 - 90	0.01	79 - 90	75 - 79	0 - 75	Gregg Drilling
IRZB0038A	5/21/2003	53.7	78	0.75	68 - 78	0.01	67 - 78	62 - 67	0 - 62	Kehoe Testing
IRZB0038B	5/21/2003	53.7	93	0.75	78 - 93	0.01	77 - 93	72 - 77	0 - 72	Kehoe Testing
IRZB0039	5/20/2003	54.2	93	0.75	68 - 93	0.01	66.5 - 93	60 - 66.5	0 - 60	Kehoe Testing
IRZB0040	5/22/2003	54.2	93.2	0.75	68.2 - 93.2	0.01	66.7 - 93.2	60 - 66.7	0 - 60	Kehoe Testing
IRZB0041	5/27/2003	54.2	93.5	1.5	68.5 - 93.5	0.01	67.5 - 93.5	61.2 - 67.5	0 - 61.2	West Hazmat
IRZB0042A	5/27/2003	54.24	78	0.75	68 - 78	0.01	67.5 - 78	61.5 - 67.5	0 - 61.5	Kehoe Testing
IRZB0042B	5/27/2003	54.24	93	0.75	78 - 93	0.01	77 - 93	71.5 - 77	0 - 71.5	Kehoe Testing
IRZB0043A	5/19/2003	54.2	78	0.75	68 - 78	0.01	67 - 78	61.5 - 67	0 - 61.5	Kehoe Testing
IRZB0043B	5/19/2003	54.2	93	0.75	78 - 93	0.01	77 - 93	71.5 - 77	0 - 71.5	Kehoe Testing
IRZB0044	5/27/2003	54.2	93	0.75	68 - 93	0.01	67 - 93	62 - 67	0 - 62	Kehoe Testing
IRZB0045A	5/23/2003	54.37	78	0.75	68 - 78	0.01	67 - 78	65.5 - 67	0 - 65.5	Kehoe Testing

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Well	Completion Date	Surface Elevation (MSL, ft)	Total Depth (ft)	Casing Diameter (inches)	Screened Interval (ft bgs)	Slot Size (inches)	Sand Pack (ft bgs)	Bentonite Seal (ft bgs)	Volclay Grout (ft bgs)	Drilling Contractor
IRZB0045B	5/23/2003	54.37	93	0.75	78 - 93	.01	76 - 93	74.5 - 76	0 - 74.5	Kehoe Testing
IRZB0046A	5/22/2003	54.22	78	0.75	68 - 78	.01	66.5 - 78	65 - 66.5	0 - 65	Gregg Drilling
IRZB0046B	5/22/2003	54.22	93	0.75	78 - 93	.01	76.5 - 93	75 - 76.5	0 - 75	Gregg Drilling
IRZB0047A	5/27/2003	54.32	78	0.75	68 - 78	.01	67 - 78	62 - 67	0 - 62	Kehoe Testing
IRZB0047B	5/27/2003	54.32	93	0.75	78 - 93	.01	77 - 93	72 - 77	0 - 72	Kehoe Testing
IRZB0048	5/23/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	WDC
IRZB0049A	5/23/2003	54.36	78	0.75	68 - 78	.01	67 - 78	62 - 67	0 - 62	Kehoe Testing
IRZB0049B	5/23/2003	54.36	93	0.75	78 - 93	.01	77 - 93	72 - 77	0 - 72	Kehoe Testing
IRZB0050A	5/27/2003	54.09	78	0.75	68 - 78	.01	67 - 78	62 - 67	0 - 62	Gregg Drilling
IRZB0050B	5/27/2003	54.09	93	0.75	78 - 93	.01	77 - 93	72 - 77	0 - 72	Gregg Drilling
IRZB0051A	5/27/2003	54.27	78	0.75	68 - 78	.01	67 - 78	62 - 67	0 - 62	Gregg Drilling
IRZB0051B	5/27/2003	54.27	93	0.75	78 - 93	.01	77 - 93	72 - 77	0 - 72	Gregg Drilling
IRZB0052	5/23/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	Kehoe Testing
IRZB0053	5/23/2003	54.2	93	0.75	68 - 93	.01	67 - 93	65.5 - 67	0 - 65.5	WDC
IRZB0054A	5/23/2003	54.3	78	0.75	68 - 78	.01	66.5 - 78	64 - 66.5	0 - 64	Gregg Drilling
IRZB0054B	5/23/2003	54.3	93	0.75	78 - 93	.01	76 - 93	74.5 - 76	0 - 74.5	Gregg Drilling
IRZB0055A	5/23/2003	54.3	78	0.75	68 - 78	.01	67 - 78	62 - 67	0 - 62	Gregg Drilling
IRZB0055B	5/23/2003	54.3	93	0.75	78 - 93	.01	77 - 93	72 - 77	0 - 72	Gregg Drilling
IRZB0056	5/27/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	Kehoe Testing
IRZB0057	5/22/2003	54.3	93	0.75	68 - 93	.01	67 - 93	60 - 67	0 - 60	Gregg Drilling
IRZB0058	5/23/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	Kehoe Testing
IRZB0059	5/23/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	62 - 66.5	0 - 62	Gregg Drilling
IRZB0060	5/23/2003	54.3	93	0.75	68 - 93	.01	66 - 93	62 - 66	0 - 62	Gregg Drilling
IRZB0061	5/22/2003	54.3	93	0.75	68 - 93	.01	67 - 93	61 - 67	0 - 61	WDC
IRZB0062	9/4/2003	49.93	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0063	5/22/2003	54.3	93	0.75	68 - 93	.01	67 - 93	65.5 - 67	0 - 65.5	Gregg Drilling
IRZB0064	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	62 - 66.5	0 - 62	Gregg Drilling
IRZB0065	5/23/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	Kehoe Testing

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IRZB0066	5/23/2003	54.3	93	0.75	68 - 93	.01	67 - 93	62 - 67	0 - 62	Kehoe Testing
IRZB0067	5/22/2003	54.3	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0068	9/4/2003	49.96	90	0.75	65 - 90	.01	64 - 90	59 - 64	0 - 59	Kehoe Testing
IRZB0069	5/22/2003	54.3	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0070	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Kehoe Testing
IRZB0071	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Kehoe Testing
IRZB0072	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Kehoe Testing
IRZB0073	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Kehoe Testing
IRZB0074	9/4/2003	50.06	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0075	9/4/2003	50.18	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0076	9/4/2003	49.81	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0077	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Kehoe Testing
IRZB0078	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Gregg Drilling
IRZB0079	5/22/2003	54.3	93	0.75	68 - 93	.01	67 - 93	61 - 67	0 - 61	WDC
IRZB0080	9/5/2003	49.78	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0081	9/4/2003	50.28	89.5	0.75	64.5 - 89.5	.01	63 - 89.5	61.5 - 63	0 - 61.5	Kehoe Testing
IRZB0082	9/5/2003	49.97	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0083	9/4/2003	49.86	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0084	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Gregg Drilling
IRZB0085	5/22/2003	54.3	93	0.75	68 - 93	.01	66.5 - 93	65 - 66.5	0 - 65	Gregg Drilling
IRZB0086	5/22/2003	54.3	93	0.75	68 - 93	.01	67 - 93	61 - 67	0 - 61	WDC
IRZB0087	9/5/2003	49.75	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0088	9/5/2003	49.64	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0089	9/5/2003	50.16	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0090	9/4/2003	49.74	90	0.75	65 - 90	.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0091	9/4/2003	49.63	89.5	0.75	64.5 - 89.5	.01	63 - 89.5	61.5 - 63	0 - 61.5	Kehoe Testing
IRZB0092	5/19/2003	54.3	83	0.75	68 - 83	.01	66.5 - 83	62 - 66.5	0 - 62	Kehoe Testing
IRZB0093	5/19/2003	54.3	83	0.75	68 - 83	.01	66.5 - 83	62 - 66.5	0 - 62	Kehoe Testing

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IRZB0094	9/5/2003	49.48	90	0.75	65 - 90	0.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0095	9/5/2003	50.08	90	0.75	65 - 90	0.01	63.2 - 90	61.7 - 63.2	0 - 61.7	Kehoe Testing
IRZB0096	9/5/2003	49.95	90	0.75	65 - 90	0.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0097	9/5/2003	48.78	90	0.75	65 - 90	0.01	63.5 - 90	62 - 63.5	0 - 62	Kehoe Testing
IRZB0098	5/19/2003	54.3	83	0.75	68 - 83	0.01	66.5 - 83	62 - 66.5	0 - 62	Gregg Drilling
IRZB0099	5/22/2003	54.3	93	0.75	68 - 93	0.01	67 - 93	62 - 67	0 - 62	WDC
IRZC0001	8/6/2003	48.05	117.5	1.5	92.5 - 117.5	0.01	91 - 117.5	80 - 91	0 - 80	WDC
IRZC0002	8/7/2003	48.76	118	1.5	93 - 118	0.01	91.5 - 118	90 - 91.5	0 - 90	WDC
IRZC0003	8/8/2003	49.21	117.5	1.5	92.5 - 117.5	0.01	91 - 117.5	80 - 91	0 - 80	WDC
IRZC0004	8/8/2003	48.59	117.5	1.5	92.5 - 117.5	0.01	91.5 - 117.5	80 - 91.5	0 - 80	WDC
IRZC0005	8/7/2003	48.88	116.5	1.5	91.5 - 116.5	0.01	90 - 116.5	80 - 90	0 - 80	WDC
IRZC0006	8/6/2003	48.32	116.5	1.5	91.5 - 116.5	0.01	90 - 116.5	80 - 90	0 - 80	WDC
IRZC0007	5/7/2003	53.23	121	1.5	96 - 121	0.01	95 - 121	84 - 95	0 - 84	WDC
IRZC0008	5/7/2003	53.22	121	1.5	96 - 121	0.01	95 - 121	84 - 95	0 - 84	WDC
IRZC0009	5/7/2003	53.22	124.5	1.5	99.5 - 124.5	0.01	98.5 - 124.5	87.5 - 98.5	0 - 87.5	WDC
IRZC0010	8/7/2003	49.10	117.5	1.5	92.5 - 117.5	0.01	91.5 - 117.5	81 - 91.5	0 - 81	WDC
IRZC0011	8/7/2003	48.74	118	1.5	93 - 118	0.01	92 - 118	90.5 - 92	0 - 90.5	WDC
IRZC0012	8/7/2003	48.27	117	1.5	93 - 117	0.01	91 - 117	80 - 91	0 - 80	WDC
IRZC0013	5/9/2003	53.21	120	1.5	95 - 120	0.01	94 - 120	84.5 - 94	0 - 84.5	WDC
IRZC0014	5/8/2003	53.22	120	1.5	95 - 120	0.01	94 - 120	85.5 - 94	0 - 85.5	WDC
IRZC0015	5/8/2003	53.22	121.5	1.5	96.5 - 121.5	0.01	95.5 - 121.5	84.5 - 95.5	0 - 84.5	WDC
IRZC0016	5/7/2003	53.23	124.5	1.5	100.5 - 124.5	0.01	99.5 - 124.5	89 - 99.5	0 - 89	WDC
IRZC0017	8/6/2003	48.80	116	1.5	91 - 116	0.01	90 - 116	81 - 90	0 - 81	WDC
IRZC0018	5/7/2003	53.25	124.5	1.5	99.5 - 124.5	0.01	98.5 - 124.5	87.5 - 98.5	0 - 87.5	WDC
IRZC0019	5/9/2003	53.25	120	1.5	95 - 120	0.01	94 - 120	84.5 - 94	0 - 84.5	WDC
IRZC0020	5/12/2003	53.05	124.5	1.5	99.5 - 124.5	0.01	98.5 - 124.5	87.5 - 98.5	0 - 87.5	WDC
AW0135	8/21/2003	51.26	86	0.75	66 - 86	0.01	65-86	58 - 65	0 - 58	Gregg Drilling
AW0136	8/29/2003	50.95	88	0.75	68 - 88	0.01	67 - 88	65.5 - 67	0 - 65.5	Gregg Drilling

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AW0137	8/21/2003	51.11	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Gregg Drilling
AW0138	8/21/2003	51.37	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Kehoe Testing
AW0139	8/21/2003	51.28	86.5	1.5	66.5 - 86.5	0.01	63.5 - 86.5	60.5 - 63.5	0 - 60.5	West Hazmat
AW0140	8/21/2003	50.78	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Kehoe Testing
AW0141	8/21/2003	52.25	87.5	1.5	67.5 - 87.5	0.01	64.5 - 87.5	61.5 - 64.5	0 - 61.5	West Hazmat
AW0142	8/21/2003	52.44	87	0.75	67 - 87	0.01	66 - 87	59 - 66	0 - 59	Gregg Drilling
AW0143	8/21/2003	52.15	87	0.75	67 - 87	0.01	66 - 87	59 - 66	0 - 59	Gregg Drilling
AW0144	8/21/2003	52.08	87	0.75	67 - 87	0.01	66 - 87	59 - 66	0 - 59	Kehoe Testing
AW0145	8/21/2003	52.13	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0146	8/21/2003	52.72	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Kehoe Testing
AW0147	5/8/2003	51.75	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0148	5/8/2003	52.92	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0149	5/8/2003	52.88	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0150	8/21/2003	52.93	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0151	8/25/2003	53.01	85	0.75	65 - 85	0.01	64 - 85	62.5 - 64	0 - 62.5	Gregg Drilling
AW0152	8/21/2003	52.88	87.5	0.75	67.5 - 87.5	0.01	66 - 87.5	61 - 66	0 - 61	Gregg Drilling
AW0153	5/8/2003	51.50	85	0.75	65 - 85	0.01	64 - 85	57 - 64	0 - 57	Kehoe Testing
AW0154	5/8/2003	52.94	85	0.75	65 - 85	0.01	64 - 85	56 - 64	0 - 56	Kehoe Testing
AW0155	5/8/2003	52.89	88	0.75	68 - 88	0.01	67 - 88	60 - 67	0 - 60	Kehoe Testing
AW0156	8/21/2003	52.98	88	1.5	68 - 88	0.01	65 - 88	62 - 65	0 - 62	West Hazmat
AW0157	8/21/2003	51.08	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Gregg Drilling
AW0158	8/22/2003	53.62	86	0.75	66 - 86	0.01	65 - 86	58 - 65	0 - 58	Kehoe Testing
AW0159	8/22/2003	51.37	85	0.75	65 - 85	0.01	64 - 85	57 - 64	0 - 57	Kehoe Testing
AW0160	8/22/2003	49.53	84	0.75	64 - 84	0.01	63 - 84	56 - 63	0 - 56	Kehoe Testing
AW0161	8/21/2003	48.98	85	0.75	65 - 85	0.01	64 - 85	57 - 64	0 - 57	Kehoe Testing
AW0162	8/26/2003	50.10	84	0.75	64 - 84	0.01	63 - 84	61.5 - 63	0 - 61.5	Gregg Drilling

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AW0163	8/26/2003	48.67	84	0.75	64 - 84	0.01	63 - 84	61.5 - 63	0 - 61.5	Gregg Drilling
AW0164	8/26/2003	49.35	84	0.75	64 - 84	0.01	63 - 84	61.5 - 63	0 - 61.5	Gregg Drilling
AW0165	8/26/2003	49.82	85	0.75	65 - 85	0.01	64 - 85	62.5 - 64	0 - 62.5	Gregg Drilling

Notes:

Well constructed using Schedule 40 PVC.

ft bgs Feet below ground surface

MSL Mean sea level

Table 2. Pressure Test Data
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Los Angeles, California

Well	Installation Date	Pressure Injection Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
IRZB0001	5/20/2003	5/23/2003	30.1	8.0	8	Passed			
IRZB0002	5/19/2003	5/23/2003	30.2	5.0	7.5	Passed			
IRZB0003	5/20/2003	5/23/2003	30.3	<2.0	12	Passed			
IRZB0004	5/20/2003	5/23/2003	30.2	5.0	7.5	Passed			
IRZB0005	5/20/2003	5/23/2003	30	9.0	5	Passed			
IRZB0006	5/23/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0007	5/22/2003	5/27/2003	30.1	<2.0	12	Passed			
IRZB0008	5/20/2003	5/23/2003	30.7	<2.0	13	Passed			
IRZB0009	5/20/2003	5/23/2003	30.3	<2.0	12	Passed			
IRZB0010	5/20/2003	5/23/2003	30.3	3.0	8	Passed			
IRZB0011	5/21/2003	5/23/2003	30.5	<2.0	10.5	Passed			
IRZB0012	5/21/2003	5/27/2003	30.1	<2.0	11	Passed			
IRZB0013	5/22/2003	5/27/2003	30.3	<2.0	13	Passed			
IRZB0014	5/21/2003	5/27/2003	21.4	<2.0	11	Passed			
IRZB0015	5/21/2003	5/23/2003	30.3	<2.0	12	Passed			
IRZB0016	5/21/2003	5/23/2003	15.3	8.0	6	Failed	5/30/2003	Passed	Well was reinstalled.
IRZB0017	5/23/2003	5/27/2003	36.8	5.0	8	Passed			
IRZB0018	5/27/2003	5/30/2003	30.2	<2.0	8	Passed			
IRZB0019	5/23/2003	5/27/2003	30.4	<2.0	15	Passed			
IRZB0020	5/19/2003	5/23/2003	31.1	12.0	3	Passed			
IRZB0021	5/27/2003	5/30/2003	37.1	<2.0	9	Passed			
IRZB0022	5/23/2003	5/30/2003	25.1	4.0	7	Passed			
IRZB0023A	5/23/2003	5/27/2003	30.1	<2.0	12	Failed			Well was reinstalled but not retested to accommodate construction schedule.
IRZB0023B	5/23/2003	5/27/2003	30	12.0	5	Passed			
IRZB0024	5/27/2003	5/30/2003	32.1	<2.0	8	Passed			
IRZB0025	5/22/2003	5/27/2003	32	<2.0	15	Passed			
IRZB0026A	5/27/2003	5/30/2003	22.6	7.0	4	Failed	6/11/2003	Passed	Well was reinstalled.
IRZB0026B	5/27/2003	5/30/2003	26	<2.0	12	Passed			
IRZB0027A	5/28/2003	5/30/2003	46	20.0	1	Passed			
IRZB0027B	5/28/2003	5/30/2003	25.2	<2.0	11	Passed			

Table 2. Pressure Test Data
Former Boeing C-6 Facility
Los Angeles, California

Well	Installation Date	Pressure Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
IRZB0028	5/27/2003	5/30/2003	67.8	<2.0	10	Passed			
IRZB0029	5/21/2003	5/30/2003	30.4	<2.0	14	Passed			
IRZB0030A	5/23/2003	5/27/2003	30.3	<2.0	11	Passed			
IRZB0030B	5/23/2003	5/27/2003	30	12.0	4	Passed			
IRZB0031A	5/21/2003	5/23/2003	30	10.0	3.5	Passed			
IRZB0031B	5/21/2003	5/23/2003	31	7.0	6	Passed			
IRZB0032	5/27/2003	5/30/2003	30.7	<2.0	5	Passed			
IRZB0033A	5/23/2003	5/30/2003	26.1	8.0	4	Passed			
IRZB0033B	5/23/2003	5/27/2003	30.1	<2.0	11	Passed			
IRZB0034A	5/27/2003	5/30/2003	15.1	12.0	7	Failed	6/11/2003	Passed	Well was reinstalled.
IRZB0034B	5/27/2003	5/30/2003	28.5	<2.0	16	Passed			
IRZB0035	5/28/2003	5/27/2003	30.7	<2.0	13.5	Passed			
IRZB0036	5/21/2003	5/30/2003	25.4	<2.0	12	Passed			
IRZB0037A	6/25/2003								Well was not tested to accommodate construction schedule.
IRZB0037B	6/25/2003								Well was not tested to accommodate construction schedule.
IRZB0038A	5/21/2003	5/23/2003	30	9.0	4.5	Passed			
IRZB0038B	5/21/2003	5/23/2003	32.2	<2.0	12	Passed			
IRZB0039	5/20/2003	5/30/2003	25.3	<2.0	13	Passed			
IRZB0040	5/22/2003	5/23/2003	30.8	<2.0	11	Passed			
IRZB0041	5/27/2003	5/30/2003	27.5	<2.0	8	Passed			
IRZB0042A	5/27/2003	5/30/2003	25.1	11.0	5	Passed			
IRZB0042B	5/27/2003	5/30/2003	25.3	<2.0	11	Passed			
IRZB0043A	5/19/2003	5/23/2003	30	7.0	6	Passed			
IRZB0043B	5/19/2003	5/23/2003	30.4	<2.0	12	Passed			
IRZB0044	5/27/2003	5/30/2003	25.1	<2.0	11	Passed			
IRZB0045A	5/23/2003	5/30/2003	23.5	5.0	6.5	Failed	6/11/2003	Passed	Well was reinstalled.
IRZB0045B	5/23/2003	5/30/2003	25.2	<2.0	10	Passed			
IRZB0046A	5/22/2003	5/27/2003	30.1	10.0	5	Passed			
IRZB0046B	5/22/2003	5/27/2003	30.3	<2.0	14	Passed			
IRZB0047A	5/27/2003	5/30/2003	25.3	5.0	2.5	Passed			

Table 2. Pressure Test Data
Former Boeing C-6 Facility
Los Angeles, California

Well	Installation Date	Pressure Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
IRZB0047B	5/27/2003	5/30/2003	25.5	<2.0	12	Passed			
IRZB0048	5/23/2003	5/27/2003	31	<2.0	13	Passed			
IRZB0049A	5/23/2003	5/30/2003	20.5	15.0	2.5	Passed			
IRZB0049B	5/23/2003	5/30/2003	26.4	<2.0	15	Passed			
IRZB0050A	5/27/2003	5/30/2003	25.3	8.0	3	Passed			
IRZB0050B	5/27/2003	5/30/2003	25.4	<2.0	8	Passed			
IRZB0051A	5/27/2003	5/30/2003	26	5.0	9	Passed			
IRZB0051B	5/27/2003	5/30/2003	25.3	<2.0	12	Passed			
IRZB0052	5/23/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0053	5/23/2003	5/27/2003	30	<2.0	10.5	Passed			
IRZB0054A	5/23/2003	5/27/2003	30.1	12.0	4	Passed			
IRZB0054B	5/23/2003	5/27/2003	30.8	4.0	8	Passed			
IRZB0055A	5/23/2003	5/27/2003	30.1	<2.0	12	Passed			
IRZB0055B	5/23/2003	5/30/2003	26.1	<2.0	11	Passed			
IRZB0056	5/27/2003	5/30/2003	25.4	<2.0	14	Passed			
IRZB0057	5/22/2003	5/30/2003	25.1	<2.0	13	Passed			
IRZB0058	5/23/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0059	5/23/2003	5/27/2003	30.1	<2.0	9	Passed			
IRZB0060	5/23/2003	5/27/2003	30.2	<2.0	13	Passed			
IRZB0061	5/22/2003	5/27/2003	30.1	<2.0	12	Passed			
IRZB0062	9/4/2003	9/8/2003	24.1	13.0	15	Passed			
IRZB0063	5/22/2003	5/27/2003	30.1	<2.0	12	Passed			
IRZB0064	5/22/2003	5/27/2003	30	4.0	8	Passed			
IRZB0065	5/23/2003	5/27/2003	30.4	<2.0	11	Passed			
IRZB0066	5/23/2003	5/27/2003	30.4	<2.0	12	Passed			
IRZB0067	5/22/2003	5/27/2003	30.1	<2.0	12	Passed			
IRZB0068	9/4/2003	9/8/2003	30.4	14.0	16	Passed			
IRZB0069	5/22/2003	5/27/2003	30.2	<2.0	10	Passed			
IRZB0070	5/22/2003	5/27/2003	30.1	<2.0	10	Passed			
IRZB0071	5/22/2003	5/27/2003	30.3	<2.0	11	Passed			

Table 2. Pressure Test Data
Former Boeing C-6 Facility
Los Angeles, California

Well	Installation Date	Pressure Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
IRZB0072	5/22/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0073	5/22/2003	5/27/2003	30.1	<2.0	11.5	Passed			
IRZB0074	9/4/2003	9/8/2003	35.2	13.0	15	Passed			
IRZB0075	9/4/2003	9/8/2003	35.5	13.0	15	Passed			
IRZB0076	9/4/2003	9/8/2003	35.2	11.0	16	Passed			
IRZB0077	5/22/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0078	5/22/2003	5/27/2003	30.2	<2.0	9.5	Passed			
IRZB0079	5/22/2003	5/27/2003	30.2	<2.0	12	Passed			
IRZB0080	9/5/2003	9/8/2003	35.3	12.0	16	Passed			
IRZB0081	9/4/2003	9/8/2003	35.6	10.0	16	Passed			
IRZB0082	9/5/2003	9/8/2003	41.2	9.0	18	Passed			
IRZB0083	9/4/2003	9/8/2003	40.9	12.0	16	Passed			
IRZB0084	5/22/2003	5/27/2003	30.2	4.0	8.5	Passed			
IRZB0085	5/22/2003	5/27/2003	30.1	6.0	7	Passed			
IRZB0086	5/22/2003	5/27/2003	30.1	<2.0	11	Passed			
IRZB0087	9/5/2003	9/8/2003	40.1	15.0	14	Passed			
IRZB0088	9/5/2003	9/8/2003	40.4	15.0	15	Passed			
IRZB0089	9/5/2003	9/8/2003	40.4	13.0	16	Passed			
IRZB0090	9/4/2003	9/8/2003	40.1	14.0	16	Passed			
IRZB0091	9/4/2003	9/8/2003	40.3	16.0	15	Passed			
IRZB0092	5/19/2003	5/23/2003	34.8	<2.0	11.5	Passed			
IRZB0093	5/19/2003	5/23/2003	44.2	4.0	8	Passed			
IRZB0094	9/5/2003	9/8/2003	40.7	8.0	19	Passed			
IRZB0095	9/5/2003	9/8/2003	40.3	15.0	16	Passed			
IRZB0096	9/5/2003	9/8/2003	40.2	15.0	17	Passed			
IRZB0097	9/5/2003	9/8/2003	40.9	15.0	14	Passed			
IRZB0098	5/19/2003								Well was not tested to accommodate construction schedule.
IRZB0099	5/22/2003								Well was not tested to accommodate construction schedule.
IRZC01	8/6/2003	8/14/2003	100.7	18.0	16	Passed			
IRZC02	8/7/2003	8/14/2003	100.9	5.0	24	Passed			

Table 2. Pressure Test Data
Former Boeing C-6 Facility
Los Angeles, California

Well	Installation Date	Pressure Injection Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
IRZC03	8/8/2003	8/14/2003	101.7	8.0	21	Passed			
IRZC04	8/8/2003	8/14/2003	101.5	4.0	24	Passed			
IRZC05	8/7/2003	8/14/2003	100.4	4.0	24	Passed			
IRZC06	8/6/2003	8/14/2003	101.6	4.0	24	Passed			
IRZC07	5/7/2003	5/12/2003	101.7	3.0	18	Passed			
IRZC08	5/7/2003	5/12/2003	90.2	<2.0	18	Passed			
IRZC09	5/7/2003	5/12/2003	100.4	<2.0	17	Passed			
IRZC10	8/7/2003	8/14/2003	102	4.0	24	Passed			
IRZC11	8/7/2003	8/14/2003	102.6	4.0	24	Passed			
IRZC12	8/7/2003	8/14/2003	103.6	10.0	20	Passed			
IRZC13	5/9/2003	5/12/2003	90	<2.0	10	Passed			
IRZC14	5/8/2003	5/12/2003	89.5	<2.0	14	Passed			
IRZC15	5/8/2003	5/12/2003	95.9	<2.0	16	Passed			
IRZC16	5/7/2003	5/12/2003	79.9	<2.0	17.5	Passed			
IRZC17	8/6/2003	8/14/2003	150.2	6.0	22	Passed			
IRZC18	5/7/2003	5/12/2003	99.1	<2.0	19	Passed			
IRZC19	5/9/2003	5/12/2003	103.2	<2.0	19	Passed			
IRZC20	5/12/2003								Well was not tested to accommodate construction schedule.
AW0135	8/21/2003	8/25/2003	30.6	20.0	12	Passed			
AW0136	8/29/2003	8/25/2003	5.5	20.0	0	Failed			Well was reinstalled but not retested to accommodate construction schedule.
AW0137	8/21/2003	8/25/2003	30.7	18.0	11	Passed			
AW0138	8/21/2003	8/25/2003	33.4	14.0	18	Passed			
AW0139	8/21/2003	8/25/2003	77.9	<2.0	24	Passed			
AW0140	8/21/2003	8/25/2003	31.2	14.0	15	Passed			
AW0141	8/21/2003	8/25/2003	78	<2.0	24	Passed			
AW0142	8/21/2003	8/25/2003	31	16.0	13	Passed			
AW0143	8/21/2003	8/25/2003	36	18.0	12	Passed			
AW0144	8/21/2003	8/25/2003	30.5	10.0	16	Passed			
AW0145	8/21/2003	8/25/2003	31.2	14.0	14	Passed			

Table 2. Pressure Test Data
Former Boeing C-6 Facility
Los Angeles, California

Well	Installation Date	Pressure Injection Test Date	Injection Volume (gallons)	Pressure (psi)	Average Flow Rate (gpm)	Passed/Failed	Date of Retest	Passed/Failed	Comments
AW0146	8/21/2003	8/25/2003	30.9	12.0	16	Passed			
AW0147	5/8/2003	5/12/2003	25.6	2.0	9	Passed			
AW0148	5/8/2003	5/12/2003	25.6	2.0	11	Passed			
AW0149	5/8/2003	5/12/2003	25.3	2.0	10	Passed			
AW0150	8/21/2003	8/25/2003	30.1	12.0	15	Passed			
AW0151	8/25/2003	8/25/2003	11.1	17.0	0	Failed	8/27/2003	Passed	Well was reinstalled.
AW0152	8/21/2003	8/25/2003	30.7	18.0	13	Passed			
AW0153	5/8/2003	5/12/2003	25.1	5.0	8	Passed			
AW0154	5/8/2003	5/12/2003	25.6	2.0	10	Passed			
AW0155	5/8/2003	5/12/2003	26.6	2.0	10	Passed			
AW0156	8/21/2003	8/25/2003	76.7	<2.0	21	Passed			
AW0157	8/21/2003	8/25/2003	30.3	16.0	11	Passed			
AW0158	8/22/2003	8/25/2003	30.3	16.0	10	Passed			
AW0159	8/22/2003	8/25/2003	31.1	14.0	12	Passed			
AW0160	8/22/2003	8/25/2003	51	10.0	16	Passed			
AW0161	8/21/2003	8/25/2003	52	6.0	14	Passed			
AW0162	8/26/2003	8/25/2003	20.1	20.0	8	Failed	8/27/2003	Passed	Well was reinstalled.
AW0163	8/26/2003	8/25/2003	15.2	15.0	0	Failed	8/27/2003	Passed	Well was reinstalled.
AW0164	8/26/2003	8/25/2003	29.3	12.0	14	Failed	8/27/2003	Passed	Well was reinstalled.
AW0165	8/26/2003	8/25/2003	27	16.0	12	Failed	8/27/2003	Passed	Well was reinstalled.

psi: Pounds per square inch

gpm: gallons per minute

ARCADIS

Table 3. Groundwater Monitoring Well Construction
Former Boeing C-6 Facility
Los Angeles, California

Well	Completion Date	TOC Elevation (MSL, ft)	Total Depth (ft)	Casing Diameter (inches)	Screened Interval (ft bgs)	Slot Size (inches)	Sand Pack (ft bgs)	Bentonite Seal (ft bgs)	Volclay Grout (ft bgs)	Drilling Contractor
IRZMW001A	6/26/2002	54.18	75	1.5	65-75	0.01	63 - 75	59 - 63	0 - 59	WDC
IRZMW001B	6/26/2002	54.10	90	1.5	80-90	0.01	79 - 90	75 - 79	0 - 59	WDC
IRZMW002A	6/3/2003	54.07	78	1.5	68 - 78	0.01	66 - 78	60 - 66	0 - 60	WDC
IRZMW002B	6/3/2003	54.17	93	1.5	83-93	0.01	82 - 93	78 - 82	0 - 62	WDC
IRZMW003A	6/2/2003	54.14	71	1.5	61 - 71	0.01	60 - 71	50 - 60	0 - 50	WDC
IRZMW003B	6/2/2003	54.20	90	1.5	80 - 90	0.01	79 - 90	71 - 79	0 - 61	WDC
IRZMW004	9/4/2003	50.48	90	4	65-90	0.01	63 - 90	56.5 - 63	0 - 56.5	WDC
IRZMW005	9/5/2003	50.19	90	4	65-90	0.01	63 - 90	56.5 - 63	0 - 56.5	WDC
IRZCMW001	8/6/2003	49.14	117	4	92 - 117	0.01	90 - 117	80 - 90	0 - 80	WDC
IRZCMW002	5/12/2003	52.98	121	4	96 - 121	0.01	94 - 121	86 - 94	0 - 86	WDC
IRZCMW003	8/8/2003	49.12	117	4	92 - 117	0.01	90 - 117	80.5 - 90	0 - 80.5	WDC
CMW001	8/15/2003	51.81	124	4	99-124	0.01	97 - 124	60 - 97	0 - 60	WDC
CMW002	8/14/2003	SDP	124	4	99-124	0.01	97 - 124	60 - 97	0 - 60	WDC
CMW026	8/6/2003	48.94	117	4	92-117	0.01	90 - 117	80 - 90	0 - 80	WDC
MW0005	8/8/2003	49.57	85	4	65 - 85	0.01	63 - 85	58 - 63	0 - 58	WDC

Notes:

Well constructed using Schedule 40 PVC.

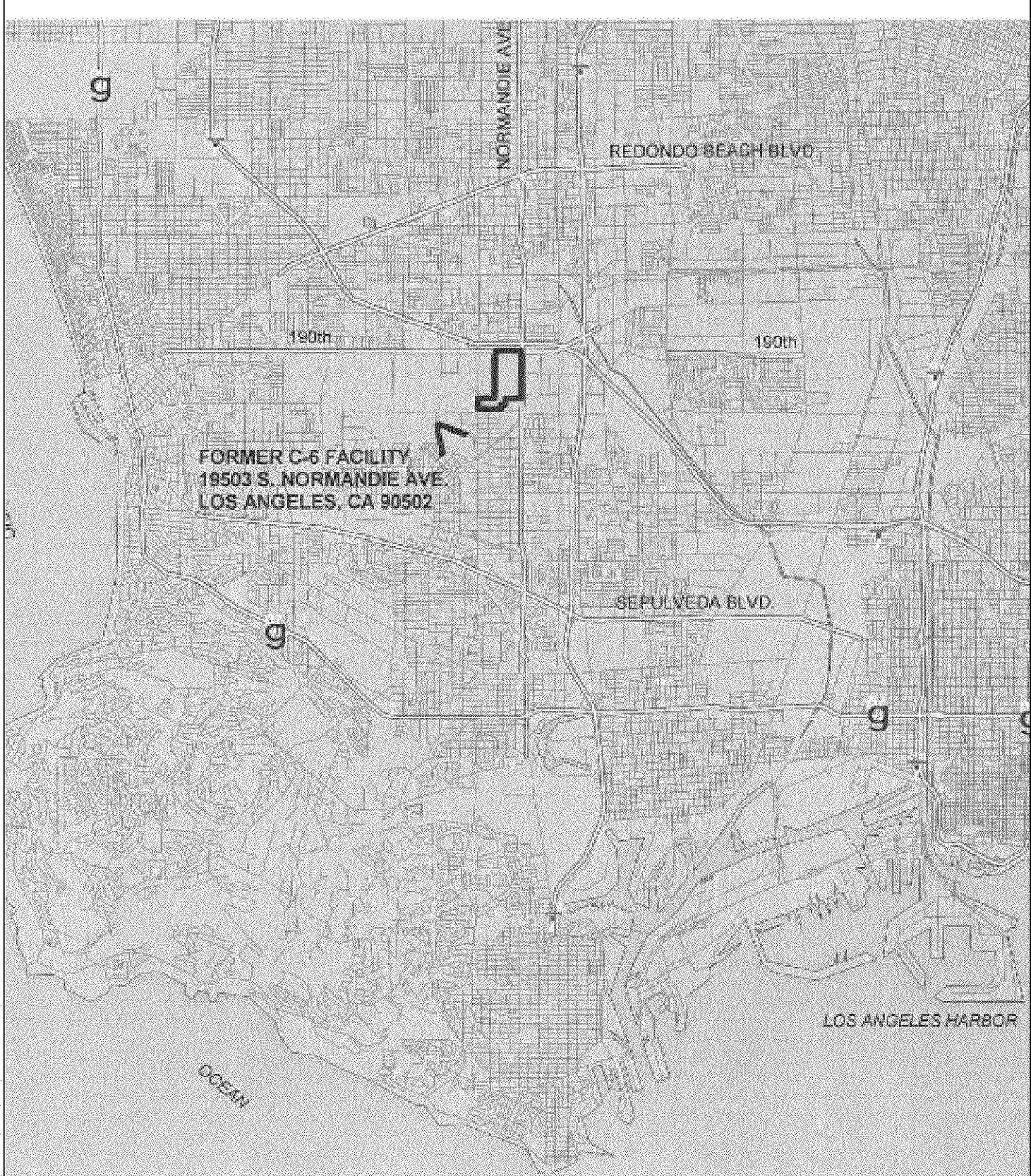
TOC Top of casing

MSL Mean sea level

ft bgs Feet below ground surface

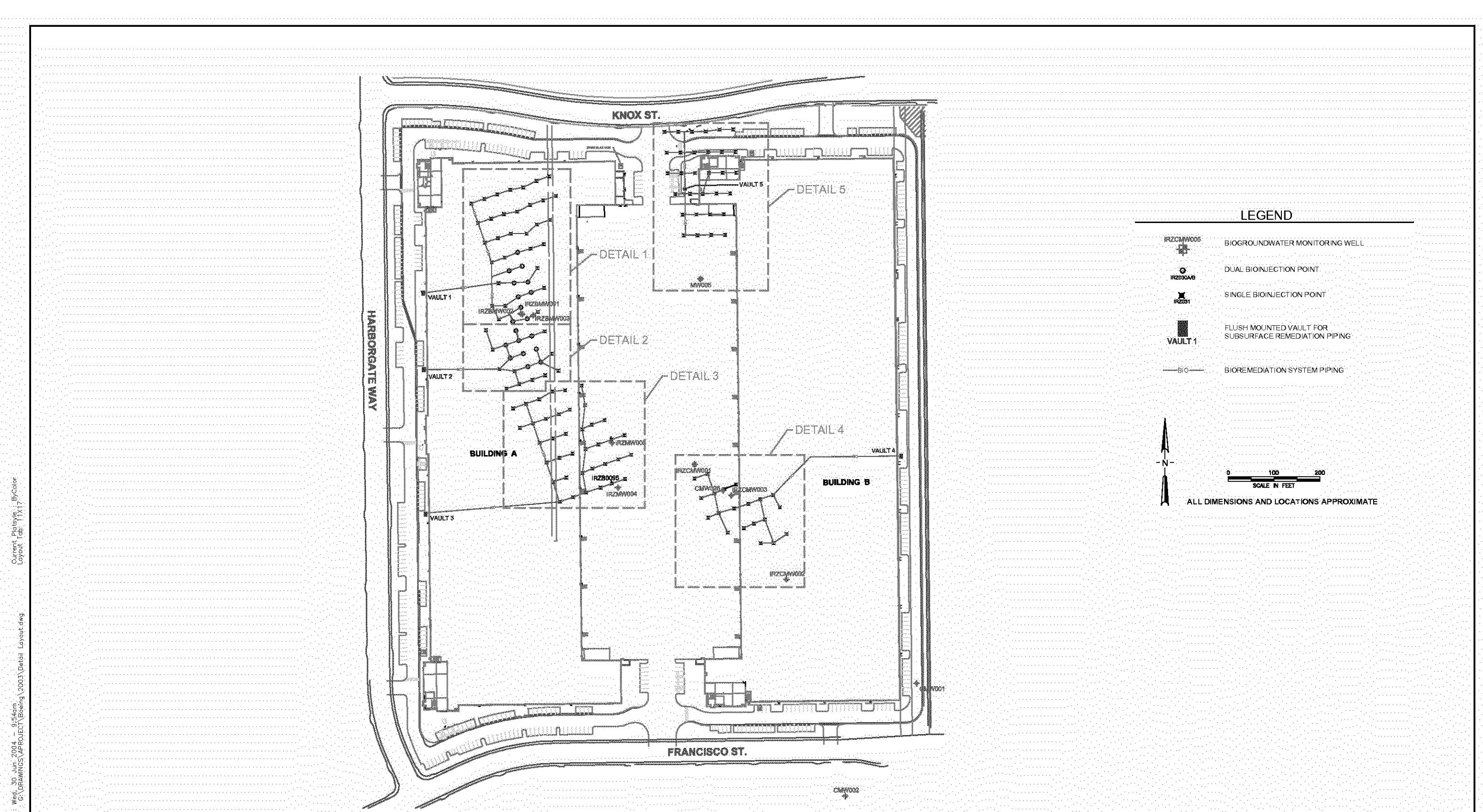
SDP Survey data pending

Figures



Base map download from 'Tiger File' data website hosted by ESRI

Area Manager K. THOMAS	 ARCADIS Arcadis of Los Angeles 1400 N. Harbor Boulevard, Suite 700 Fullerton, CA 92635-4127 Tel: 714-278-0002 Fax: 714-278-0051 www.arcadis-us.com	Project Number CA 584.03.06
Project Director J. MOWATEN		Delivery Date 02/04
Task Manager D. POLEY		Figure
Technical Reviewer A. QUINONES		1
SITE LOCATION MAP		BOEING REALTY CORPORATION FORMER C-6 FACILITY, LOS ANGELES, CA



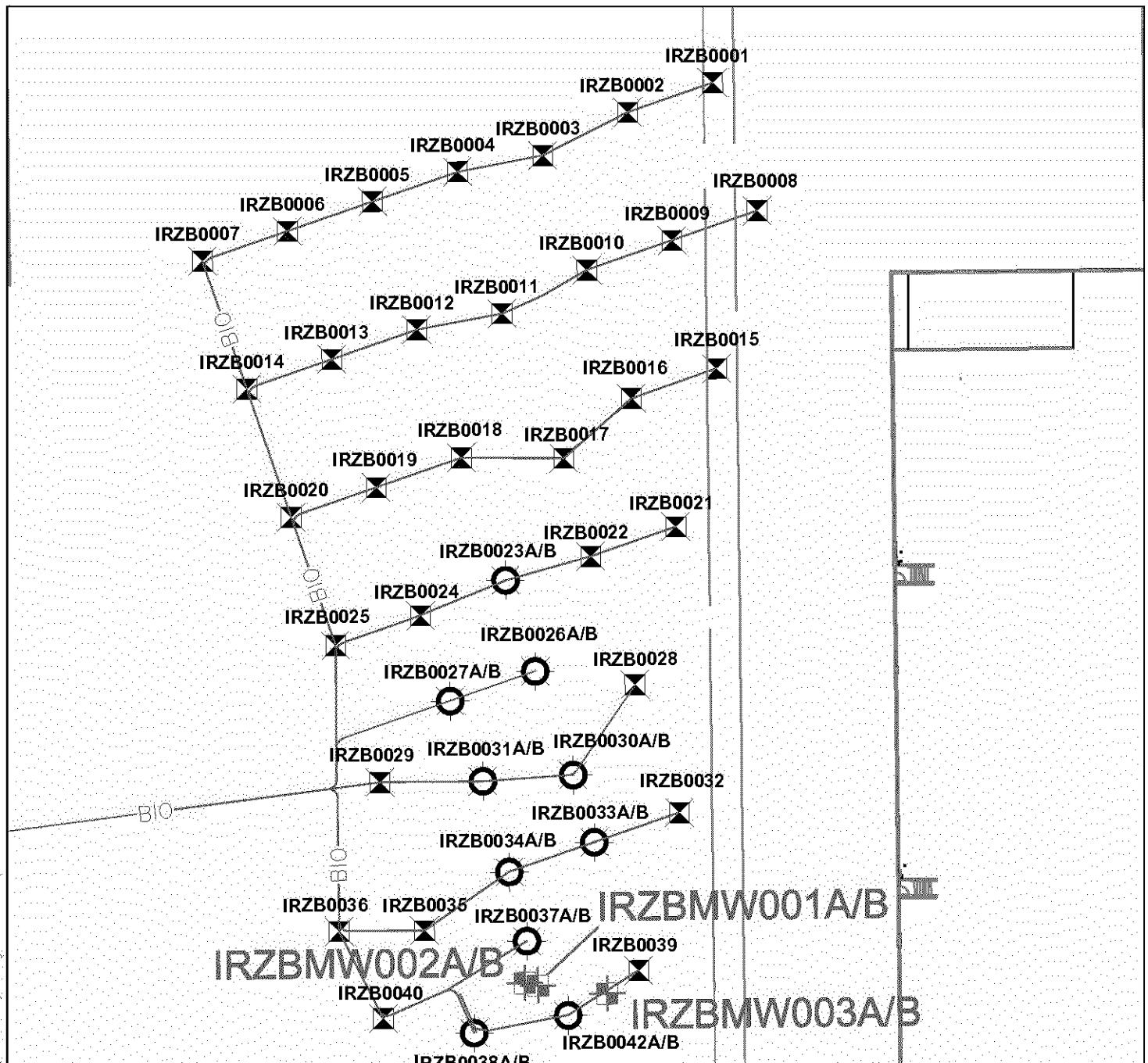
BASE MAP PROVIDED BY HILL PINKERT ARCHITECTS, INC. IN FEBRUARY 2003

Area Manager K. THOMAS	Project Number CA 594.03.05
Project Director J. NGUYEN	Drawing Date 6/28/04
Task Manager O. POLEY	Figure 2
Technical Review	
A. QUINONES	

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AMENDMENT POINT AND MONITORING WELL LOCATIONS

BOEING REALTY CORPORATION
FORMER C-6 FACILITY, LOS ANGELES, CALIFORNIA



LEGEND

- IRZCMW005: BIOGROUNDWATER MONITORING WELL
- IRZB0030A/B: DUAL BIOINJECTION POINT
- IRZB0031: SINGLE BIOINJECTION POINT
- Vault 1: FLUSH MOUNTED VAULT FOR SUBSURFACE REMEDIATION PIPING
- BIO: BIOREMEDIATION SYSTEM PIPING

0 25 50
SCALE IN FEET

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

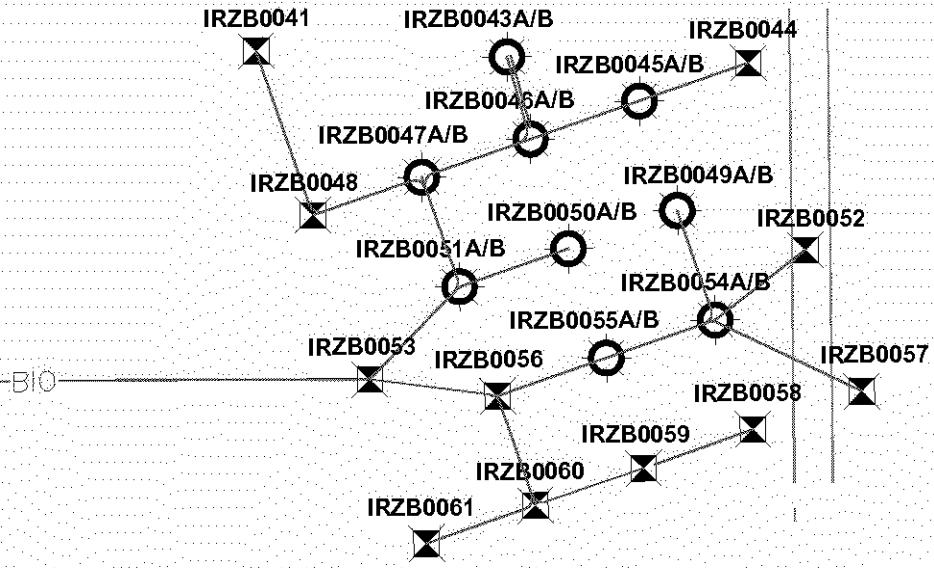
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Project Number CA 594.03.05

Drawing Date 6/29/04

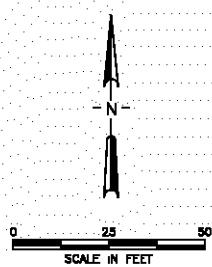
Figure

3



LEGEND

- IRZBMONWS BIOPROCESS MONITORING WELL
- IRZB0030A/B DUAL BIOINJECTION POINT
- IRZB0031 SINGLE BIOINJECTION POINT
- Vault 1 FLUSH MOUNTED VAULT FOR SUBSURFACE REMEDIATION PIPING
- BIO BIOPROCESS SYSTEM PIPING



BASE MAP PROVIDED BY HILL-PINKERT ARCHITECTS, INC. IN FEBRUARY 2003

ALL DIMENSIONS AND LOCATIONS APPROXIMATE



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DETAIL 2 LAYOUT

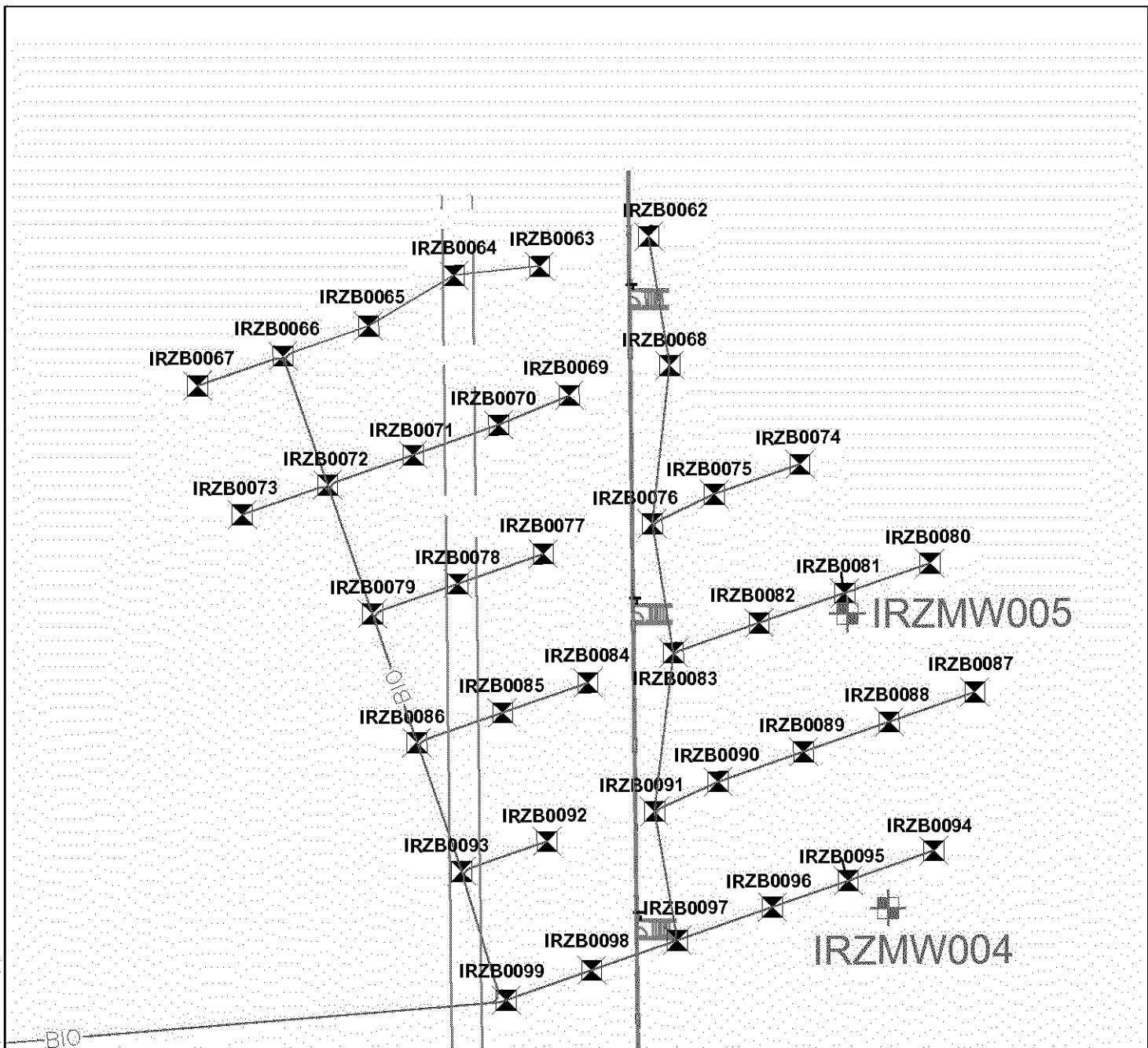
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CA 594.03.05

Drawing Date
6/29/04

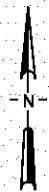
Figure

4

BOEING REALTY CORPORATION
FORMER C-6 FACILITY, LOS ANGELES, CA

**LEGEND**

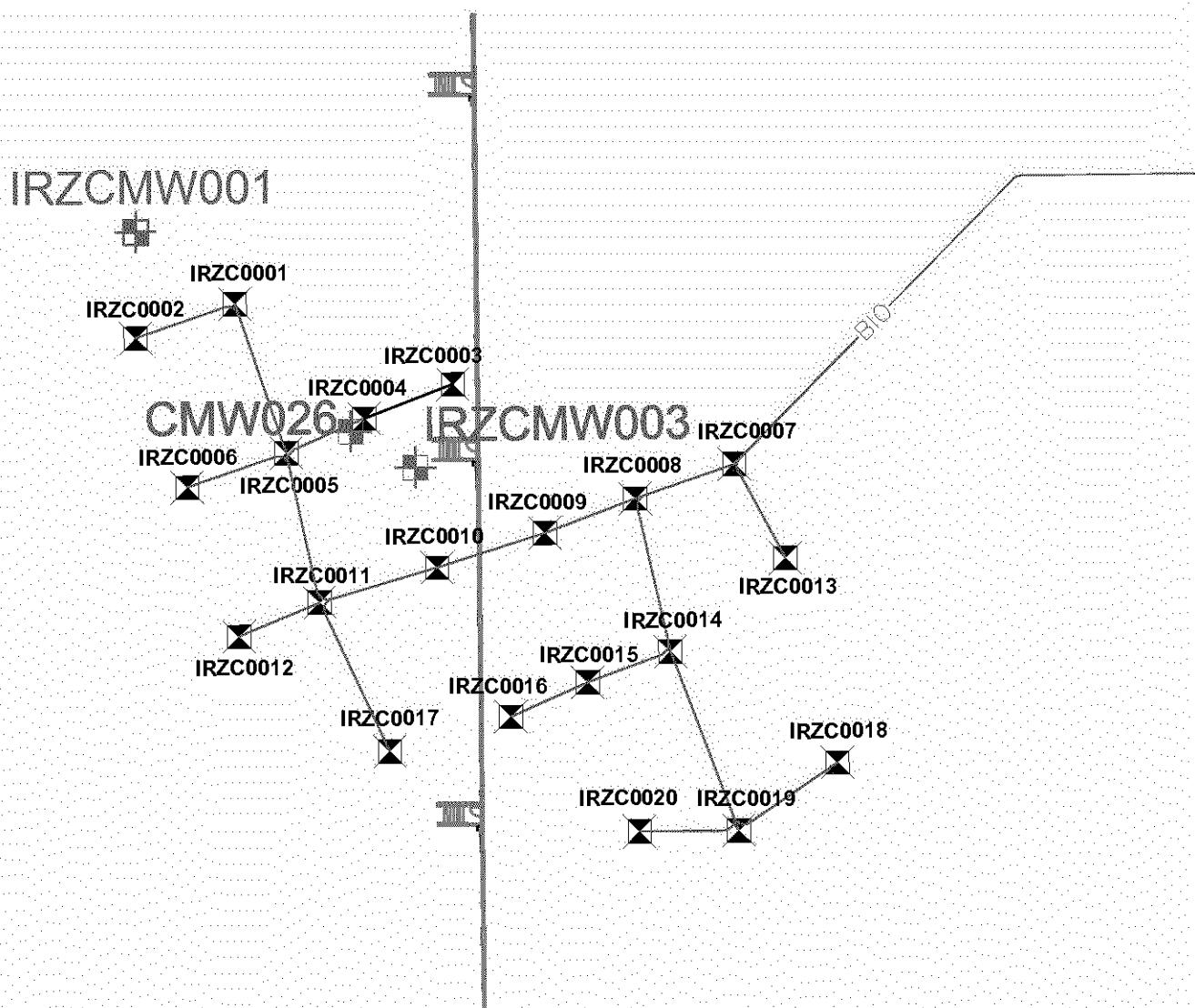
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- IRZB0031: SINGLE BIOINJECTION POINT
- VAULT 1: FLUSH MOUNTED VAULT FOR SUBSURFACE REMEDIATION PIPING
- BIO: BIOREMEDIATION SYSTEM PIPING

0 25 50
SCALE IN FEET

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

BASE MAP PROVIDED BY HILL-PINKERT ARCHITECTS, INC. IN FEBRUARY 2003

Area Manager K. THOMAS	ARCADIS	Project Number CA 594.03.05
Project Director J. NGUYEN		Drawing Date 6/29/04
Task Manager D. POLEY		Figure
Technical Review A. QUINONES		5
DETAIL 3 LAYOUT		
BOEING REALTY CORPORATION FORMER C-6 FACILITY, LOS ANGELES, CA		

**LEGEND**

- IRZCMW001S BIOPROCESS MONITORING WELL
- IRZB0030AB DUAL BIOINJECTION POINT
- IRZB0031 SINGLE BIOINJECTION POINT
- VAULT 1 FLUSH MOUNTED VAULT FOR SUBSURFACE REMEDIATION PIPING
- BIO BIOPREMEDIATION SYSTEM PIPING



0 25 50
SCALE IN FEET

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

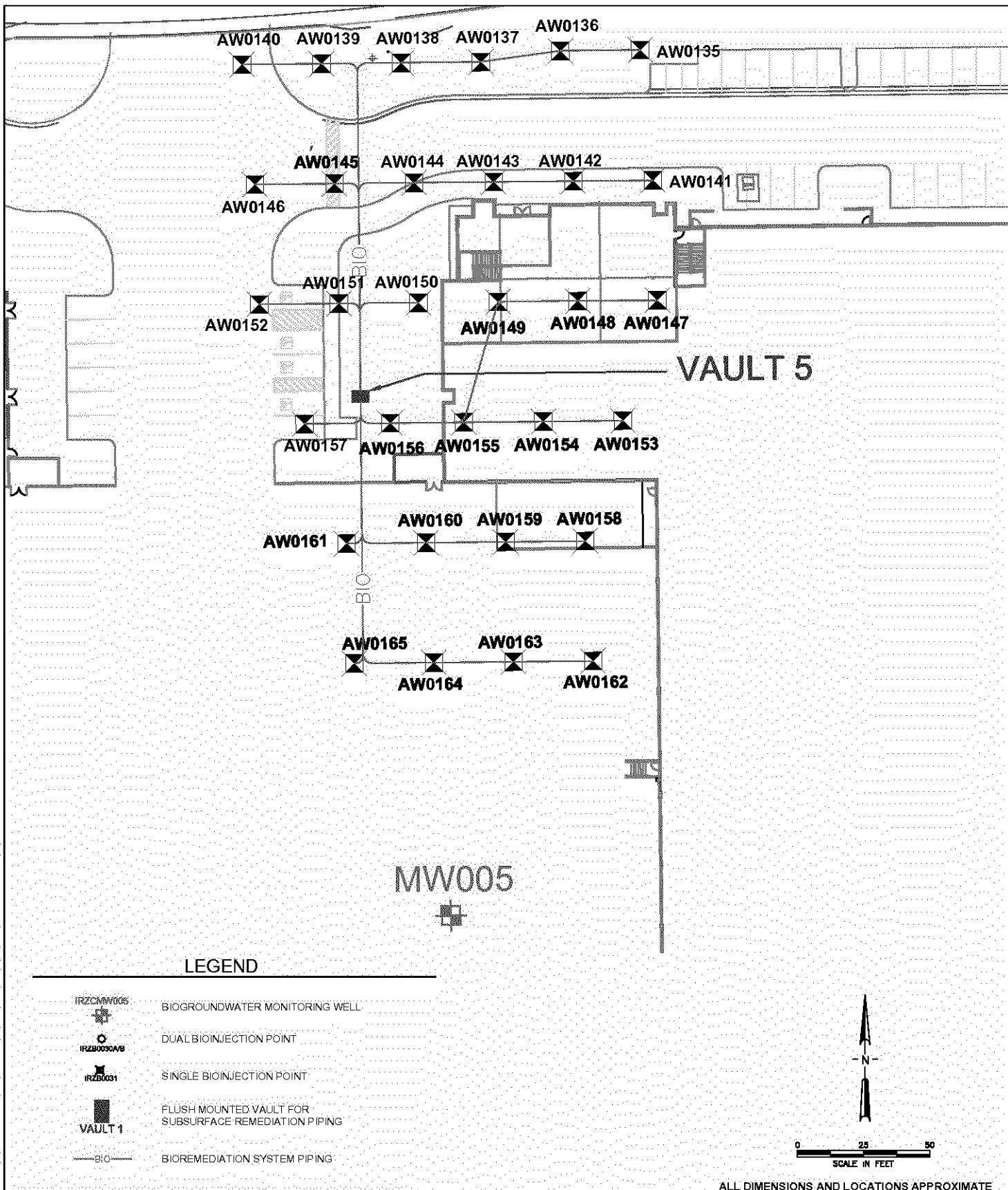
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Area Manager K. THOMAS		Project Number CA 594.03.05
Project Director J. NGUYEN		Drawing Date 6/29/04
Task Manager D. POLEY		Figure
Technical Reviewer A. QUINONES		6

DETAIL 4 LAYOUT

BOEING REALTY CORPORATION
FORMER C-6 FACILITY, LOS ANGELES, CA

BOE-C6-0010162



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ALL DIMENSIONS AND LOCATIONS APPROXIMATE



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DETAIL 5 LAYOUT

BOEING REALTY CORPORATION
FORMER C-6 FACILITY, LOS ANGELES, CA

Project Number
CA 594.03.05

Drawing Date
6/29/04

Figure

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